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WHAT WORKS?
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Research Monograph # 15

How can teachers use data to improve student achievement at the elementary level?

Research Tells Us

- Planned use of data is a common characteristic of high-performing schools.

- Successful use of data to drive decision making results from a strategic focus on specific issues.

- Teachers vary in their conceptions of what valuable data are and of how data should be used.

- Translating data into priorities, goals and strategies requires that data are clearly linked to school-planning and decision-making processes.

- Teachers need a clear process, time to acquire skills and guidance from an expert to translate data into useful information.

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Using Data to Improve Student Achievement

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As lifelong learners, teachers recognize that their professional practice continues to evolve as they reflect and act on new information.[1] If teachers have information that helps them confidently identify the root of educational challenges and track progress, they can more readily develop action plans that will have a positive impact on their students. All teachers share a common goal: to see every student succeed. So, what are some effective ways to work with information to improve student achievement?

In the context of education, data is a synonym for information. Data can be words, numbers, or observations that are collected systematically, usually for a specific purpose. Educational data include (but are not limited to):

- student achievement data such as teacher observational notes of students' performance in class, samples of students' class work, student portfolios, results of formal and informal classroom assessment, report cards or large-scale assessment results

- other student data relevant to the students such as student mobility, attendance data, behavioural incident data and homework completion

- contextual data that are not under the direct control of the teacher (such as students' linguistic background, gender or community socio-economic factors) but are important to consider when planning for improved student achievement

Lessons Learned from the Research Literature

Most research articles on the uses of data for improving student achievement are case study reports of school practices. Relatively few studies contain evaluations of these practices.[2] This monograph focuses primarily on research that evaluates

school data use, in order to highlight some effective practices in this fast-changing area and to forge connections between research and practice.

Lesson 1. Flying blind through large amounts of data doesn't work.

Teachers need to develop an understanding of the process of data investigation. To build their capacity to use data, teachers must not only access and analyze data, but also use their skills of inquiry, such as formulating questions and interpreting results.[3,4] Successful use of data to drive decision making is not random, but results from a strategic focus on specific issues.[5]

Researchers[6] propose five steps to effective data use:

1. determine what you want to know
2. collect or access data
3. analyze results
4. set priorities and goals
5. develop strategies

I would add to these a sixth step – follow up – in order to assess the success of the strategy. The suggestion of a follow up on strategies implies that the steps to effective data use are part of a cyclical process.

Lesson 2. Teachers must decide what data are useful to their investigation.

Teachers vary in their conception of what data are valuable and how data should be used. When researchers[7] asked teachers to define "good" data, their responses tended to fall into the following categories:

- Data are psychometrically sound, such as reliable, valid predictors of future student achievement, and are an accurate measure of change over time.
- Data are aligned with valued academic outcomes, like grade-level outcome standards.
- Data provide insights into student thinking and reasoning in a particular discipline.
- Data are authentic and based on teachers' judgment.

Teachers' perspectives on the appropriate use of data also fell into four categories:

- to inform classroom instruction
- to inform student placement decisions
- to inform program and policy decisions
- to meet accountability demands.

It should be noted that tensions might arise when individuals or groups adopt differing perspectives on the valid use of data. For example, teachers reported that large-scale assessment data were neither current enough nor aligned adequately with daily instruction to be particularly useful to inform classroom practice. In another report, however, teachers stated that the information gained by systematic reviews of students' performance results on large-scale tests were useful.[8] The variation in teacher conceptions about data may be explained, in part, by the variation between educational contexts. Both the selection and use of relevant data, therefore, must be considered in relation to the educational context.

Lesson 3. Teachers need guidance to translate data into useful information.

Most teachers do not have formal training in how to draw meaning from data. A short course on research and analysis skills, while helpful, is not sufficient; teachers require a clear process, time to acquire skills and guidance from an

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Changes in Teacher Practice and School Culture

As a result of using data to drive educational decision making, teachers report:

- greater differentiation of instruction
- greater collaboration among staff
- increased sense of teacher efficacy
- improved identification of students' learning needs

Administrators and principals report that working with data-support personnel leads to more widespread feelings that instructional practice should be:

- open
- observed
- discussed
- not something that happens behind closed doors

expert over time.[4] Translating data into priorities, goals and strategies requires that data are clearly linked to school-planning and decision-making processes, such that specific questions are answered, school goals are supported and problems are identified.

Lesson 4. There are benefits and barriers to the successful use of data to improve student achievement.

Benefits – Planned use of data is a common characteristic among schools that are high performing or "beating the odds" in terms of student achievement.[9] The use of data to drive educational decision making results in changes in teacher practice and school culture. Teachers report greater differentiation of instruction, greater collaboration among faculty, increased sense of teacher efficacy and improved identification of students' learning needs as outcomes of data use.[5,10,11,12] Administrators and principals report that working with data support personnel leads to more widespread feelings that instructional practice should be open, observed and discussed, as opposed to something that happens behind closed doors.[5]

Barriers – These include problems with data collection or reporting systems, lack of preparation and lack of time.[9] The ability of teachers to effectively use data to improve student achievement also depends on individual, school and board-related factors. These factors include: teachers' conceptions of their roles and of what constitutes useful information, the nature of their work, their pre-existing beliefs and experience with educational reforms, their access to professional development and specialized expertise, the time afforded to consolidate new learning, their schools' culture and climate, the use of multiple data sources (i.e., triangulation) in a positive manner, and educational leadership.[5] It is complex and, like any evolution, takes time, resources, collaboration, support and persistence.

Implications for Educational Practice

As teachers, our goal is to improve students' learning. Reaching this goal will take time and several steps. The challenge is to get teachers – individually, in small groups, or in large groups – to reconsider their practice in the context of new information. Based on lessons learned from the research literature, this monograph outlines three recommendations. These recommendations may not be generalized to all contexts; the local needs of schools, boards and authorities must also be considered.

Recommendation 1. Develop professional learning communities focused on reviewing and interpreting data for the purpose of improving student achievement.

The PLC may be a school group, if the school is large enough to have more than one teacher per grade, or a board level group, if the schools have only one teacher per grade. Each member should fulfill a role within the functioning of this group. The distribution of roles for the data-related function of the group may include dealing with data reporting, interpreting data and teaching teachers about data, furnishing instructional resources linked to issues arising from data analysis, facilitating meetings so that teachers identify next steps and following up with teachers on their responses to data analysis.[13] These roles allow educators to disperse responsibilities, develop individual areas of special expertise and foster feelings of interdependency in the collaborative group. The group works together to shape learning strategies for their students. Group tasks may include, for example, a systematic review of student work from multiple sources and/or a review of large-scale assessment results, disaggregated by subtopic or skill.[14]

Systematic Processes for Gathering Information

- Gathering information for formative purposes helps you to improve your teaching and guide your students' learning.

- Gathering information for summative purposes helps you to judge the quality of students' achievement after the instructional process is completed.

Recommendation 2. Leaders must be prepared to guide a process of data investigation that results in improved student achievement.

Leadership affects teachers' engagement with the use of data for improvement. The leadership function encompasses articulating the rationale for teachers' use for particular types of data, modelling data use, planning and providing a framework for teachers to learn about using data, and structuring time to do so collaboratively.[13] In order to perform these functions, leaders themselves must have the requisite knowledge and skills to work with data, as well as an understanding of which types of professional development are effective for the teachers. Access to specialized expertise, (e.g., collaborating with experts from a university) professional development and resources may be required to help leaders prepare to fulfill this function.

Recommendation 3. Induct new teachers into a data-based decision-making culture by linking them with veteran teachers who have experience in using data to enhance student achievement.

This must go beyond a veteran teacher sharing tips with a talented novice teacher through "war stories." It must include ongoing collaboration over time in which each professional perspective is valued. Induction activities should be structured activities with protected time for veteran and new teachers to collaborate.

The process of gathering information to address specific educational issues is one way for educators to work together to reach a common goal: to see every student succeed. When the barriers to successful data are minimized, the conversations and collaborations that arise from teachers' use of data to plan for improvement can strengthen the links between school culture, teaching practice and success for students.

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